

### Bellwork: 11/15/12

Convert the following quadratic into vertex form, then graph and answer the questions about the graph:

$$y = -x^2 + 6x - 5$$

$$a = -1 \quad b = 6 \quad c = -5$$

$$\frac{-b}{2a} = \frac{-6}{2(-1)} = \frac{-6}{-2} = 3$$

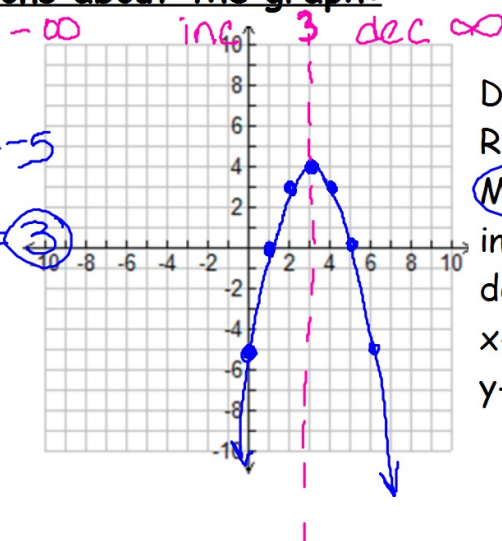
$$-(3)^2 + 6(3) - 5$$

$$-9 + 18 - 5$$

$$9 - 5 = 4$$

$$(3, 4) \quad a = -1$$

$$y = -(x-3)^2 + 4$$



$$\text{Domain: } (-\infty, \infty)$$

$$\text{Range: } (-\infty, 4]$$

$$\text{Max/Min: } (3, 4)$$

$$\text{increase: } (-\infty, 3)$$

$$\text{decrease: } (3, \infty)$$

$$\text{x-intercepts: } (1, 0) \quad (5, 0)$$

$$\text{y-intercept: } (0, -5)$$

### Writing Equations of Quadratics:

Write the equation of the quadratic function (in vertex form) using the given information:

- 1) vertex is  $(3, 7)$  and a point on the graph is  $(9, 4)$

$$y = a(x-h)^2 + k$$

$$4 = a(9-3)^2 + 7$$

$$4 = a(6)^2 + 7$$

$$4 = 36a + 7$$

$$\frac{-3}{36} = \frac{36a}{36} \quad a = -\frac{1}{12}$$

$$a = -\frac{1}{12}$$

$$(h, k) = (3, 7)$$

$$y = -\frac{1}{12}(x-3)^2 + 7$$

2) vertex is  $(3, 6)$  and the y-intercept is  $(0, 2)$

$$y = a(x-h)^2 + k$$

$$2 = a(0-3)^2 + 6$$

$$2 = a(-3)^2 + 6$$

$$\begin{array}{r} 2 = 9a + 6 \\ -6 \quad -6 \\ \hline \end{array}$$

$$\frac{-4}{9} = \frac{9a}{9}$$

$$a = -\frac{4}{9}$$

$$a = -\frac{4}{9}$$

$$h, k = (3, 6)$$

$$y = -\frac{4}{9}(x-3)^2 + 6$$

3) vertex is  $(0, 5)$  and a point on the graph is  $(1, -2)$

4) vertex is  $(-1, -4)$  and the y-intercept is  $(0, 3)$

$$y = a(x-h)^2 + k$$

$$3 = a(0+1)^2 - 4$$

$$3 = a(1)^2 - 4$$

$$\begin{array}{r} 3 = 1a - 4 \\ +4 \quad \quad +4 \\ \hline 7 = a \end{array}$$

$$a = 7$$

$$(h, k) = (-1, -4)$$

$$y = 7(x+1)^2 - 4$$

Homework: 11/15/12

handout:

writing quadratic  
equation given

vertex and a point